SOME PHONOLOGICAL RULES OF IOWA-OTO (SIOUAN)

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In 1971-2 on a small faculty research grant at Kansas State University linguistic data was collected for the unpublished "Iowa/Otoe-English Dictionary". The chief informant speaks Southern Iowa and Oto of Oklahoma.[1] Only a few speakers of Northern Iowa remain living near the Kansas-Nebraska border Iowa (Ioway/Baxoje) and Oto (Otoe/Chiwere) with the extinct Missouri (Missouria) and Winnebago make up the Chiwere sub-group of the Siouan language family The generative phonological framework is employed in the present analysis allowing some processes which eliminate previously established phonemes thus reducing the inventory of phonemes considerably. Some major rules and basic theories are presented for consideration by other Siouan scholars, though in this brief paper all rules and complete supporting data cannot be given

Three traditional phoneme inventories have been published for Iowa-Oto by Whitman (1947), Voegelin (1947), and Wolff (1958) Including the inventory of this analysis they are as follows

Whitman	p	t	č	k	p'	t'	č'	k'	b	d	j	g	ʔ	θ	ð	s	x	s'	x'	m	n	ñ	ŋ
Voegelin	p	t	č	k					b	d	j	g	ʔ	θ	ð	s	x			m	n	ñ	ŋ
Wolff	p	t	č	k					b	d	j	g	ʔ	θ	ð	s	x			m	n		ŋ
Robinson	p	t		k									ʔ	θ		s	x			m	n		

Whitman	h	w	l	y	i	ɨ	a	ą	u	ų	e	o
Voegelin	h	w	l	y	i	į	a	ą	u	ų	e	o
Wolff.	h	w	l	y	i	į	a	ą	u	ų	e	o
Robinson	h	w	r	y	i		a		u			

Voegelin accounted for glottalized stops in Whitman's inventory by rewriting them as consonant clusters according to "Dorsey's Law" of Chiwere CCV as referred to in Wolff.[2] Wolff also interprets Cʔ as a cluster in Dakota and Chiwere-Winnebago from the reconstructed *C-q cluster [3] In a parallel manner Voegelin handles the glottalized sibilants as clusters and includes an [š] in his transcription as a variant of the phoneme /s/ Wolff treats [ñ] as an allophone of /n/ preceding front vowels Further reductions in the inventory by Robinson will be shown in the rules which follow.

Briefly a few major phonological distinctions between Iowa and Oto are shown as follows

	'horse'		'open'		'side'	'squirrel'
Iowa·	s [sune]	l (No.)	[luse]	n	[saniŋe]	θ [θiŋe]
		r (So)	[ruse]			
Oto	š [šuñe]	r	[ruše]	ñ	[saniñe]	š [šiñe]

The phoneme /r/ is chosen in the combined inventory due to prevalence in present-day speech. Otherwise Southern Iowa is the norm for this paper with some reference to Oto.

Distinctive features of Southern Iowa may be seen in Chart I consisting of ten consonants, four semivowels, and three vowels Proto-Siouan forms are given from Wolff (1958).

	*p	*t	*k	*s	*s	*x	*m	*n	*l	*p		*h	*q	*i	*a	*u
	p	t	k	θ	s	x	m	n	r	w	y	h	ʔ	i	a	u
voc	-	-	-	-	-	-	-	-	+	-	-	-	-	+	+	+
cons	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-
obstr	+	+	+	-	-	-	-	-	(-)	(-)	(-)	-	+	(-)	(-)	(-)
nasal	(-)	(-)	(-)	-	-	-	+	+	(-)	(-)	(-)	(-)	(-)	-	-	-
stri	-	-	-	+	+	+	(-)	(-)								
back	-	-	+	-	-	+	-	-	(-)	+	-	(+)	(+)	-	-	+
high	(-)	(-)	(+)	(-)	(-)	(+)	(-)	(-)						+	-	+
coron	-	+	(-)	-	+	(-)	-	+	(+)	(-)	(-)	(-)	(-)			

Chart I

As in Chomsky and Halle (1968) the natural class of vowels is distinguished by the features [+vocalic, -consonantal], true consonants by the features [+consonantal, -vocalic], glides with the features [- consonantal, -vocalic], and the resonant with the features [+vocalic, +consonantal]. Nasals are distinguished from all other consonants by the feature [+nasal], a feature which is needed for nasalizing vowels The obstruent feature distinguishes stops from fricatives and h from ʔ

The obstruent series represented by Whitman, Voegelin, and Wolff is a basic p-t-k aspirated series opposed to b-d-g by the addition of the feature of voicing The fundamental difference between that and the Robinson series is a more consistent view choosing the unaspirated p-t-k (the b-d-g of former analyses) as basic with the non-phonemic rule-bound addition of aspiration in stressed syllables and optional voicing initially or intervocalic

The occurrence of the unaspirated obstruents in clusters as well as intervocalically make their choice as basic most economical. Following the stress rules all non-cluster obstruents in stressed syllables become aspirated. The bilabial stop is not found in all positions in Iowa/Oto since Proto-Siouan *p became w in unstressed syllables, e.g. náwe 'leaf', tówe 'four' In initial positions of stop plus labialization in Proto-Siouan, the obstruent feature was lost in Iowa/Oto while the glide remains, whereas tw and kw are unchanged, e.g Twiti (a name), kwaine 'hazel-nut' [4] The native-speaker knows which morphemes are affixes and which are roots or stems. Thus morphemes which are affixes keep their non-aspirated form even when elicited as free forms, giving the appearance of a phonemic contrast because of the frozen affixual form. A closer study of occurrence of w might reveal that it is simply a rule-governed variation of p in the Iowa/Oto system rather than a separate phoneme only partially derived from Proto-Siouan *w.

Some redundancy rules are as follows

1. All vowels are non-obstruent, resonant is non-obstruent.

   [+vocalic] → [-obstr]

2. All semivowels and vowels are non-nasal.

   [-cons] → [-nasal]

3 All obstruents are non-nasal.

   [+obstr] → [-nasal]

4. The feature [high] is redundant with [back] for all true consonants though it is needed in distinguishing vowels

   [+cons, αhigh] → [αback]

The Robinson inventory omits the affricate č of Whitman, Voegelin, and Wolff because the occurrence is predictable preceding non-back, non-low vowels, or, the high vowel i, according to the following rule

R1. t → č /_[+voc, -back, -low](C)V)# e g /ti/ [či] 'house'

This can be combined with Wolff's rule for [ñ] in Oto as follows [5]

$$R1' \quad \begin{bmatrix} +C \\ +coron \\ +obstru \\ \alpha nasal \end{bmatrix} \rightarrow \begin{bmatrix} -\alpha stri \\ +high \end{bmatrix} / \_\_ \begin{bmatrix} V \\ -back \\ -low \end{bmatrix} (CV)\#$$

The feature [+high] is used for adding palatalization for both nasal and obstruent, the feature [+stri] is added to the non-nasal obstruent for affrication.

It is my theory that Proto-Siouan did not have the set of nasalized vowels, but rather oral vowels and nasal consonants with a series of rules such as the following which are in effect in synchronic Iowa/Oto.

R2 Vowel Nasalization.

$$V \rightarrow \underset{\xi}{V} / \begin{cases} N\_\_N & (a) \\ \_\_N\# & (b) \end{cases}$$

R3. Nasal Assimilation.

$$N \rightarrow \begin{bmatrix} m \\ n \\ \underset{\xi}{n} \end{bmatrix} / \_\_ \begin{bmatrix} p \\ t,s,r, \theta \\ k,x \end{bmatrix}$$

The archiphoneme N takes on the feature of contact of the following stop. Syllable-initial are the full phonemes m and n. The n is a phonetic variant, I feel, preceding velar stops which in most cases are lost, but not all cases. Thus including only oral vowels and nasal consonants in the present inventory of Iowa/Oto the above rules generate most if not all nasal vowels of the language. The later N-drop rule is optional before obstruents

R4. N-drop.

$$N \rightarrow \emptyset \ / \ \begin{cases} CV\_\_\# \\ \_\_ [+nasal] \end{cases}$$

In synchronic Iowa/Oto R2a operates at a subphonemic level, R2b R3 and R4 at the phonemic. Thus according to R2-4 the following is derived.

			(By R1')
Base	wayinke 'bird'	wakan 'snake'	nąmąñi 'wagon'
R2.	wayi̯nke	wakąn	nąmąñi
R3.	wayi̯nke	---	---
R4.	---	waką	

The derivation for 'bird' is incomplete, lacking the rule for stop loss (R13) Also, 'snake' lacks stress placement and the contingent obstruent aspiration, 'wagon' lacks stress placement and vowel laxing (R9)

Stress placement rules are basically primary stress on the first CV and secondary stress on alternating syllables.

R5. [+1 stress] → (V)(C)C[V, __] (CV(CV))#

/piti/ [péce] 'fire' [with vowel laxing (R9) and vowel harmony (R10)]
/tuti/ [túče] 'burnt' [by R1, R9]
/ahata/ [aháta] 'outside'
/skati/ [skáče] 'play' [by R1, R9 also]
/paxuti/ [páxoče] 'Iowa' [by R1, R9 also]

R6 [+2 stress] → [V, +1 stress] CV C [V__] CV

/wiwaθuti/ [wíwaθóče] 'machine'

In my opinion this is a rule of compounding as Iowa/Oto roots are basically only one or two syllables, and in the case of single syllables the root has lost its other syllable or is an affix which has become a free form This is my theory also for Proto-Siouan, though further substantiation is needed Thus in Iowa/Oto words of three syllables are actually stems, and with four syllables are compounds or include reduplication All other syllables receive [+3 stress] Compounding and affix rules are given later.

R7 Aspiration.

$$\begin{bmatrix} C \\ +obstr \end{bmatrix} \rightarrow [+Aspiration] / \_\_\begin{bmatrix} V \\ +1stress \end{bmatrix}$$

Through this rule p, t, k, and č are aspirated in stressed syllables. Examples /ka/ [kʰá] 'white', /ita/ [itʰá] 'there',/piθa/ [pʰíθa] 'to bathe' (θ requires R8).

The inventory on Chart I does not include the voiced interdental fricative of previous analyses which is predictable by Rule 8.

R8. Interdental Voicing.

$$\begin{bmatrix} C \\ -obstr \\ +stri \\ -back \\ -coron \end{bmatrix} \rightarrow [+voice] \;/\; (+)(V)\_\_V$$

The interdental fricative becomes voiced intervocalically in an unstressed syllable or following a morpheme break, e.g.[píθa]= piθa 'to bathe', [manθe]= manθe 'iron, metal', it remains unvoiced in stressed syllables and as first element of a cluster, e.g [θíne] 'squirrel' (Iowa), kiθtú 'crowd' (lacks R9). Voiced interdentals which appear to occur initially are in clitics or bound morphemes where the voicing is frozen in isolation and should be listed as such in the lexicon, e g. [ði-] 'yellow' as in [ði+θéwe] 'orange' (lit. 'dark yellow'), actually /θi/ and /θiθéwe/ respectively.

R9. Vowel Laxing.

$$\begin{bmatrix} V \\ +high \end{bmatrix} \rightarrow [+lax] \;/\; \left\{ \begin{array}{l} [+voc, +cons] \\ CVC\_\_ \begin{Bmatrix} \# \\ + \end{Bmatrix} \\ \begin{bmatrix} +3 \text{ stress} \\ \hline \end{bmatrix} \end{array} \right\}$$

By this rule any high vowel of a non-affix two-syllable morpheme (root) is laxed (i→e, u→o). Following are examples of suffixes which are not affected by this rule -wi pl., -hi caus.; -ki temporal (V), reflexive (N), -mi fem. gender, i- 'at, to, by' One-syllable morphemes not affected by this rule are such as pi [pʰi] 'good', ti [čʰi] 'house'. The word for 'buffalo' is basically the same as that for 'house', but is obligatorily suffixed for gender (-mi fem. and -tuki masc) in which process the root is unstressed and laxed vowel results.

R10. Vowel Harmony Rule

$$[+voc,-cons] \rightarrow [+lax] / \_\_\_ \left\{ \begin{array}{l} [+voc, +cons] \\ [-voc, -cons] \end{array} \right\} [V, +lax]$$

By the vowel harmony rule a vowel is laxed if followed by a lax vowel where a resonant or liquid intervenes. Examples [θéwe] 'black', [kréwe] 'to vomit', [hérota] 'morning'.

The following rules apply chiefly to affixation and compounding.

R11. Vowel Deletion (Truncating)

$$V \rightarrow \emptyset \; / \; \_\_\_ + (V)C\ldots$$

By this rule the final vowel is deleted in suffixation and compounding.

R12. Back Consonant Replacement

$$[+\text{cons}, -\text{obstr}] \rightarrow [-\text{cons}, +\text{obstr}] \; / \; X[-\text{voc}, \_\_\_, \_\_\_] +$$

By R12 a back consonant is replaced by a glottal when it occurs preceding a morpheme break.

R13. Stop Loss Following Nasal

$$\begin{bmatrix} C \\ +\text{obstr} \\ \alpha\ \text{back} \\ \beta\ \text{coron} \end{bmatrix} \rightarrow \emptyset \; / \; [V, +\text{nas}] \begin{bmatrix} C \\ +\text{nas} \\ \alpha\ \text{back} \\ \beta\ \text{coron} \end{bmatrix} \_\_\_$$

This rule applies chiefly to Oto stem formation where an obstruent is lost following a nasal consonant

R14. Glottal Insertion.

$$\emptyset \rightarrow \text{ʔ} \; / \; \left\{ \begin{matrix} [+\text{obstr}] \_\_\_ \; (+)[+\text{obstr}] \\ \qquad\qquad\quad + (V)C. \\ X \_\_\_ X' \end{matrix} \right\}$$

Conditions X=X'
X= any syllable reduplicated

Rule 14 inserts a glottal stop between two obstruents, at any morpheme break where the first morpheme ends in an obstruent, and between any two syllables where the second is a reduplication of the first.

R15. Compounding Stress Rule

$$[3\ \text{stress}] \rightarrow [1\ \text{stress}] \; / \; ..\ C[+V, \_\_\_] + CVCV$$

By R5 each noun received primary stress on the first syllable (Actually, a stress jump rule is also needed to cover many cases.) In R15 where two nouns combine to form a compound, primary stress moves to the ultima of the first noun A one-syllable prefix added does not change the basic rule of stress on the first syllable, as in ti+wiri [ciwére] 'Oto', ki+taki [ki+t^{h}áke] 'to quarrel', pi+kune [pi+k^{h}úne] 'evening'.

	'bridge'	'picture'
R5.	náha máni	ʔíti wakáxe [wa+káxe]
R15.	nahá+mani	ʔití+wakaxe (lit 'face paper')

Following are derivations given as examples of other preceding rules.

	'duck'	'bird'
R2-3.	minki + sinki	wa+yínki (see R4)
R6.	mínki + sínki	wa+yínki
R9.	mínki + sínke	wa+yínke
R11.	mínk + sínke	—
R12.	minʔsinke	—
R13.	minʔsine	wa+yíne
R15.	minʔsíne	wayíne

Examples of R14 are θuʔθu 'mussel shell' and tiʔi [ceʔe] 'this, these'.

	'hips'
R5	síti + upáθi
R9.	síti + opáθe
R11.	sit + opaθe
R14.	sitʔopaθe
R15.	sitʔópaθe

R1-3 for siti in isolation yields #siče#, but here base form is retained due to morpheme break marker making R1 inapplicable The morpheme break is lost and stress falls on the phonological syllable formed at the juncture. R11,14, 15 are simultaneous

Unfortunately morpheme structure rules have not been given, but are described taxonomically in previous descriptions of Iowa-Oto. Rules for deglottalization and spirantization, not included here, should be added. The approach in this paper differs from the much more comprehensive one of Gordon (1972) for Crow, another Siouan language, although in both approaches stress and syllable as unit are recognized as important. The grouping of rules for simultaneous application requires further study.

NOTES

[1]The dictionary produced from informant work and research was coordinated with "Pagranaha Wawagaxe, A First Book An Introduction to the Iowa-Otoe Indian Language," by Thigre Pi (Jimm Good Tracks), mimeographed by the Topeka Indian Center Mrs Mary Irving of Pawnee, Oklahoma served as principal informant and was invaluable for her knowledge of both Iowa and Oto and for her informant excellence due to training at the Summer Institute of Linguistics, University of Oklahoma Mrs. Irving is presently aged and in ill health

[2]See Wolff (1950.173) for his discussion and Dorsey (1881 919-29) for the original formulation

[3]Wolff (1950 173) dealt chiefly with Chiwere-Winnebago reconstructed, though he mentions characteristics of Chiwere (in his sense) also. It must be clear that in this paper I am dealing with Chiwere alone, or Iowa-Oto specifically, though some rules may apply to Winnebago

[4]Again I refer to Wolff (1950 114, 120) with additional examples of my own added

[5]Wolff (1950 63) states "/n/ occurs in two allophones, palatal [ñ] before front vowels, and dental [n] in other positions."

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